OPTICOMM

A Uniti Group Company

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MDU Developer Guidelines New Developments

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Please consider the environment before printing this document.

Change History

Version	Description	Effective Date
8.0	Complete rewrite	27 September 2022
8.1	Released version.	9 November 2022
8.2	Minor changes	7 February 2023
8.3	Update to latest standards	20 June 2026

Changes in this revision

The detailed changes to this document, from Version 8.0 dated 27 Sep 2022 to Version 8.3 are outlined in the table below.

Version	Description
8.0	Complete rewrite
8.1	Minor corrections
8.2	Minor corrections
8.3	Removed Foxtel Requirements and reduced Comms room size and rooftop size requirements. Clarified Smart Trunk.

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1 Introduction

1.1 Purpose

This document provides design and construction guidelines for Consultants, Builders, Electrical Contractors, and Developers of Multi Dwelling Units (MDU) developments on the provision of cable pathways and comms room requirements in preparation for the installation of an Opticomm Fibre to the Premises (FTTP) network. This document does not cover Commercial, Retail, and other high density vertical high-rise developments however the principles outlined in this document may be applied, in most cases, to these types of developments

1.2 Scope

This document describes in general terms the requirements and responsibilities for the provision of cable pathways and comms rooms for the installation of an Opticomm Fibre to the Premises (FTTP) network. This document does not override any requirements defined in relevant Australian Standards and Building Codes that must be followed by builders and subcontractors.

1.3 Project Specific Requirements

Opticomm recognise each development project may have specific requirements that differ from these guidelines. The Opticomm Project Manager for the project will always work with the developer and builder to achieve the best possible outcomes for the project within the requirements set by the appropriate standards and codes.

1.4 Definitions and Interpretations

Definitions as per Opticomm standards related to MDU passive network design, are outlined in this section. Should the definition not be included here, it is presumed the definition is per the telecommunications industry standard meaning.

Table 1: Definitions

Acronym/ Product Name	Definition
AP	Access Panel. Also known as Access hatch
BAS	Building Automation Services. Also known as Integrated Communication Network (ICN) or a third-party building service provider
EWP	Elevated Work Platform
FDH	Fibre Distribution Hub. Used as an aggregation point for RDTs and may also contain optical splitters
FTA-TV	Free to Air Television
FTTP	Fibre to the Premises
DGPO	Double General Power Outlet
MCR	Main Comms Room. Also known as Comms Room, Equipment room, MDF (Main Distribution Frame) room
MDU	Multi Dwelling Unit. A single building containing more than one separate living unit
MET	Main Earthing Terminal
MSB / CSB	Main Switch Board / Consumer Switch Board
FOBOT	Fibre Optic Breakout Tray. Also known as Optical Distribution Frame (ODF) or Fibre Termination Panel (FTP)
ONT	Optical Network Terminal. Also known as a Network Termination Unit (NTU), Optical Network Unit (ONU), or NTD (network termination device)
RDT	Rapid Distribution Terminal. Also known as Network Access Port (NAP) or Fibre Access Port (FAP)
RSP	Retail Service Provider. Also known as ISP (Internet Service Provider)
SC/APC	SC-type angled physical connector
Smart Trunk	FTTP dark fibre passive network utilised to transport optical traffic for other BAS service providers
UPS	Uninterrupted Power Supply

2 Roles and Responsibilities Matrix

The roles and responsibilities of the parties involved in the successful deployment of an MDU FTTP network are outlined below.

Table 2: Telecommunications Network Roles and Responsibilities Matrix

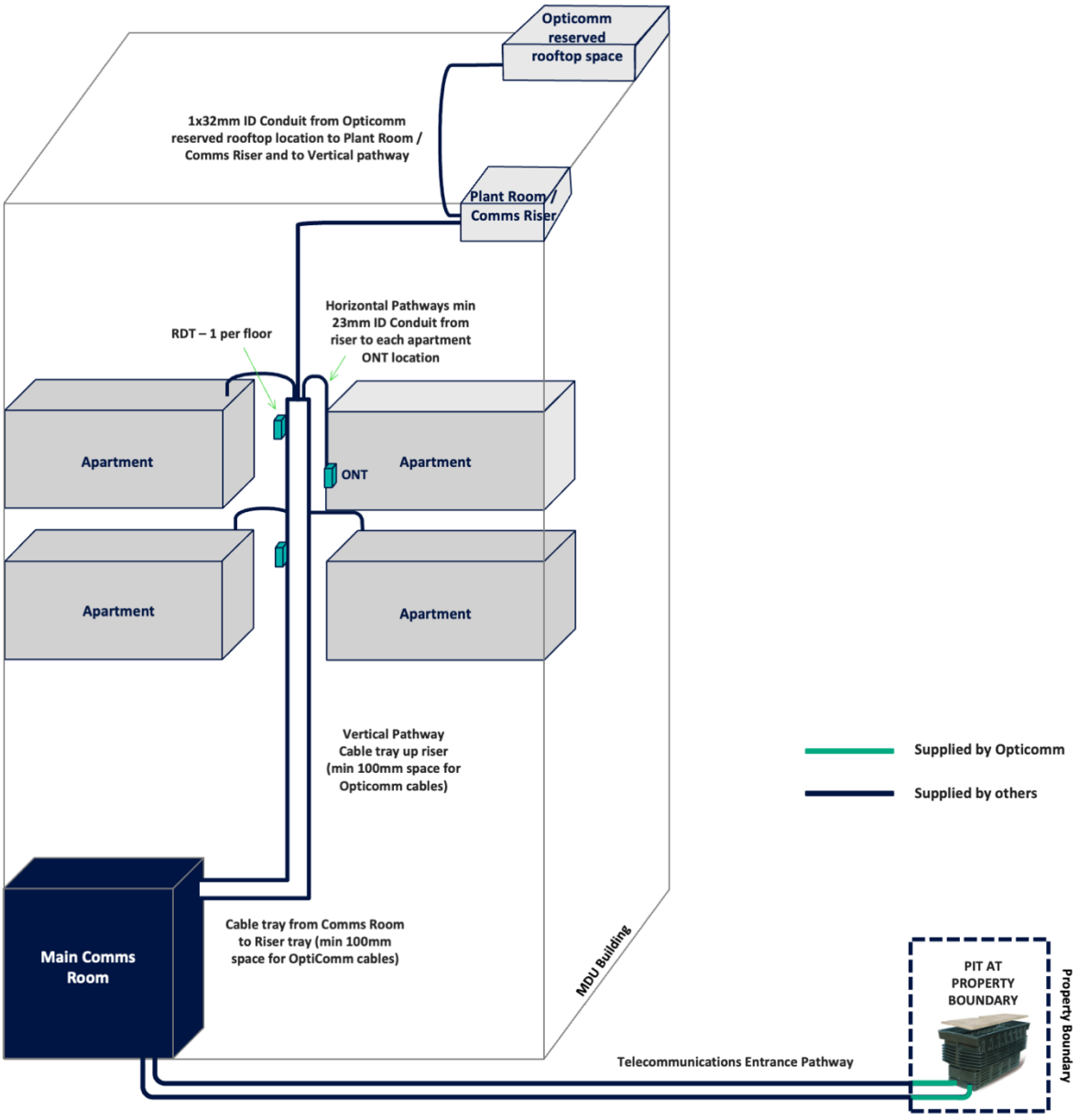
Line Item	Role	Component	Specify	Supply	Install	Commission & Test	Sign Off
1	Backhaul Provider	Backhaul connectivity to Site	Opticomm	Opticomm	Opticomm	Opticomm	Opticomm
2	Backhaul Connection	Optical Fibre interlink from external Splice Point to Comms room	Opticomm	Opticomm	Opticomm	Opticomm	Opticomm
3	Backhaul Containment	Pit and Pipe connection from Comms room to Property Boundary	Opticomm	Builder/Developer	Builder/Developer	Builder/Developer	Opticomm
4	Comms Room	Suitable Air-Conditioned Comms Room with Single Phase Power and Earthing	Opticomm	Builder/Developer	Builder/Developer	Builder/Developer	Opticomm
5	Headworks	Install Headworks Active Equipment	Opticomm	Opticomm	Opticomm	Opticomm	Opticomm
6	Cable Pathways	23mm I/D Conduit from ONT location in Apartment to Comms Riser with draw string. Cable tray in Comms Riser. Fire Stopping and Certification and Water proofing	Builder/Developer	Builder/Developer	Builder/Developer	Builder/Developer	Opticomm
7	Rooftop (FTA-TV Sites only)	A suitable location and cable pathway to install TV Equipment	Builder/Developer	Builder/Developer	Builder/Developer	Builder/Developer	Opticomm
8	Passive Optical Network	Fibre connection from each floor to basement	Opticomm	Opticomm	Opticomm	Opticomm	Opticomm
9	Passive Optical Network	Fibre connection from Apartment to comms riser	Opticomm	Opticomm	Opticomm	Opticomm	Opticomm
10	Customer Equipment	Supply and install Optical Network Terminal (ONT)	Opticomm	Opticomm	Opticomm	Opticomm	Opticomm
11	In Apartment Cabling	Apartment copper cabling (Internet/Phone and TV) from ONT location to wall outlet. Includes TV Splitters and termination of cables onto wall plates at ONT location.	Builder/Developer	Builder/Developer	Builder/Developer	Builder/Developer	Opticomm
12	In Apartment Power	Double GPO outlet at ONT location in apartment for ONT	Builder/Developer	Builder/Developer	Builder/Developer	Builder/Developer	Opticomm
13	Documentation	Customer hand-over documentation	Builder/Developer& Opticomm	Builder/Developer& Opticomm	Builder/Developer& Opticomm	Builder/Developer& Opticomm	Builder/Developer& Opticomm

3 Telecommunication Cable Pathways

Telecommunications cable pathways are the conduits and cable tray used to establish a physical pathway between the apartments and the point of building entry. A pathway must be provided to every endpoint location within the building.

Properly designed pathways are critical to ensuring the building is “Fibre Ready” and that fibre cables can be installed without damage or excessive installation time.

Figure 1: High Level overview of Telecommunications Pathways



3.1 Telecommunications Entrance Pathway

The telecommunications entrance pathway (or Lead-in Conduit) links the Main Comms Room with the external telecommunication infrastructure located at the property boundary. The builder/developer is responsible for all pathways within the property boundary whilst it will be Opticomm's responsibility to provide pathways outside the property boundary

Table 3: Opticomm recommended minimum lead-in conduit requirements

Building size (living units)	Minimum Nominal Communication conduit size (mm)	Boundary pit
2 – 1000 units > 1000 units	2xP50 or 1xP100 3x P50 or 2x P100	P6 P6 or P8

Location of Lead-in Conduits must be coordinated with the Opticomm Project Manager prior to installation

Figure 2: Example of Lead-in conduit building entry

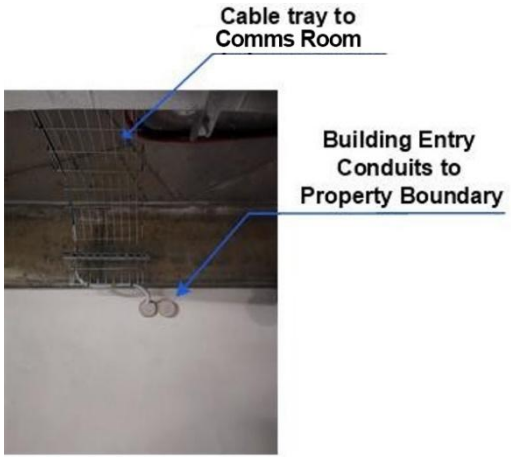
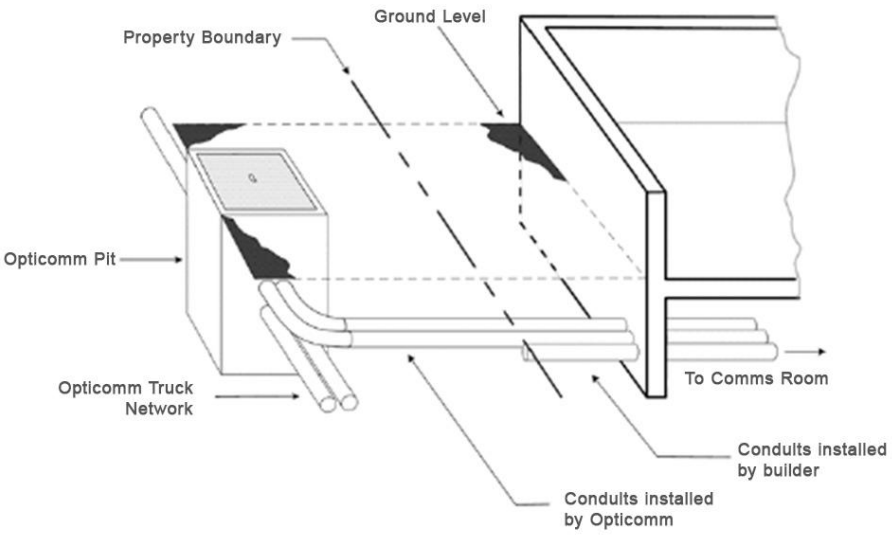


Figure 3: Entrance Pathway concept



3.2 Vertical Pathway

Vertical pathway(s) is a facility for the installation of the backbone telecommunications cable running the vertical length of the building. It is used to interconnect the Main Comms Room to the riser cupboards located on each floor and typically consist of penetrations and cable tray rising vertically through the building.

At the top floor Comms riser, 1 x 32mm conduits must be provided from the vertical cable tray to the roof top area allocated to Opticomm's FTA-TV Antenna (see Section 6).

Vertical pathways are required for cable support fixing using either:

- A **dedicated** continuous accessible cable tray with a minimum width of 100mm; or
- A **shared** cable tray with a minimum of 100mm allocated for Opticomm as well as a minimum of 100mm separation from other services/cables

Where the riser(s) are not a single continuous shaft, additional pathways using cable tray or conduit (min 2 x P50 comms) will be required to link the shafts with appropriate access at least every 15 metres and at every change of direction.

All conduits must contain a drawstring

No fibres should be self-supported over a distance greater than 200mm

Figure 4: Examples of Vertical Telecommunications Pathways

3.3 Horizontal Pathways

Horizontal pathways are conduits connecting each of the apartments to the riser cupboards.

When installing a horizontal conduit pathway:

- Use a continuous telecommunication P20 conduit (23mm Inner diameter-refer to Appendix B), between the riser cupboard and the individual apartments, for exclusive use by Opticomm
- Use sweeping bends with a minimum radius of at least 300mm
- The conduit may sweep at a large radius of greater than 2m and not be counted as a bend
- Conduits are to be tested with a mandrel of at least 80% of the conduit nominal inside diameter
- Keep bends to a maximum of three from riser to apartment if there is no access opening for hauling
- Drawstring to be pulled through end-to-end and be visible at riser and ONT location
- Label each conduit with the apartment number at the riser cupboard and at any intermediate pathway point
- Conduits can be surface mounted below the soffit or cast 'in slab'
- Each section of conduit to be less than 50m between pull/draw points

Figure 5: Examples of Horizontal Telecommunications Pathways

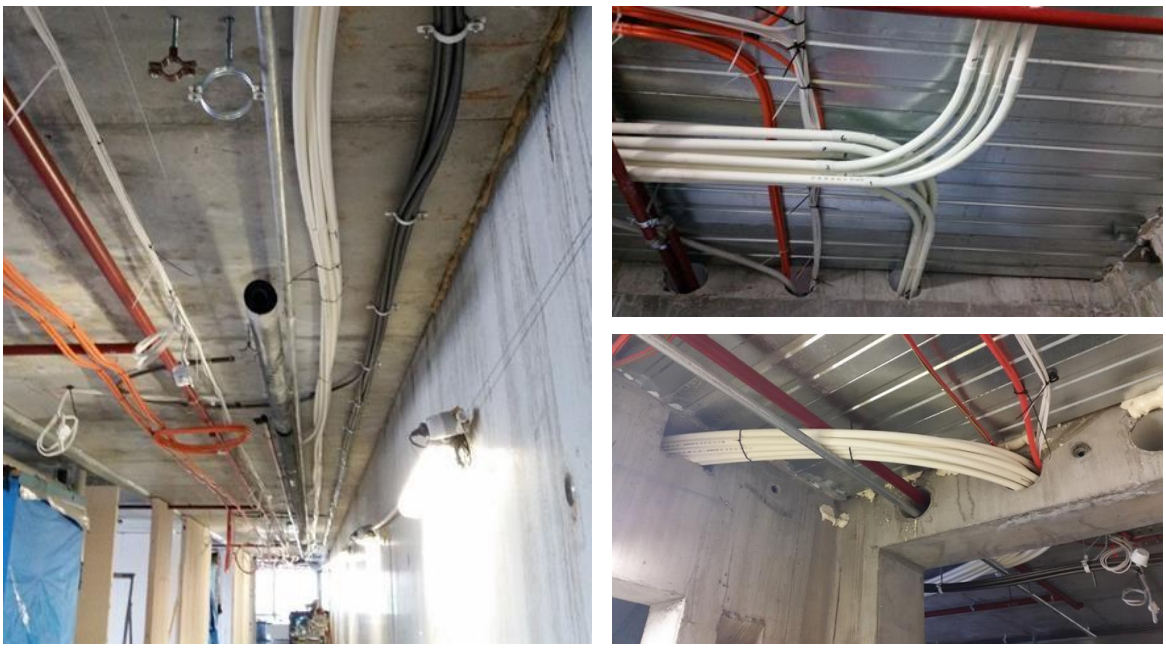
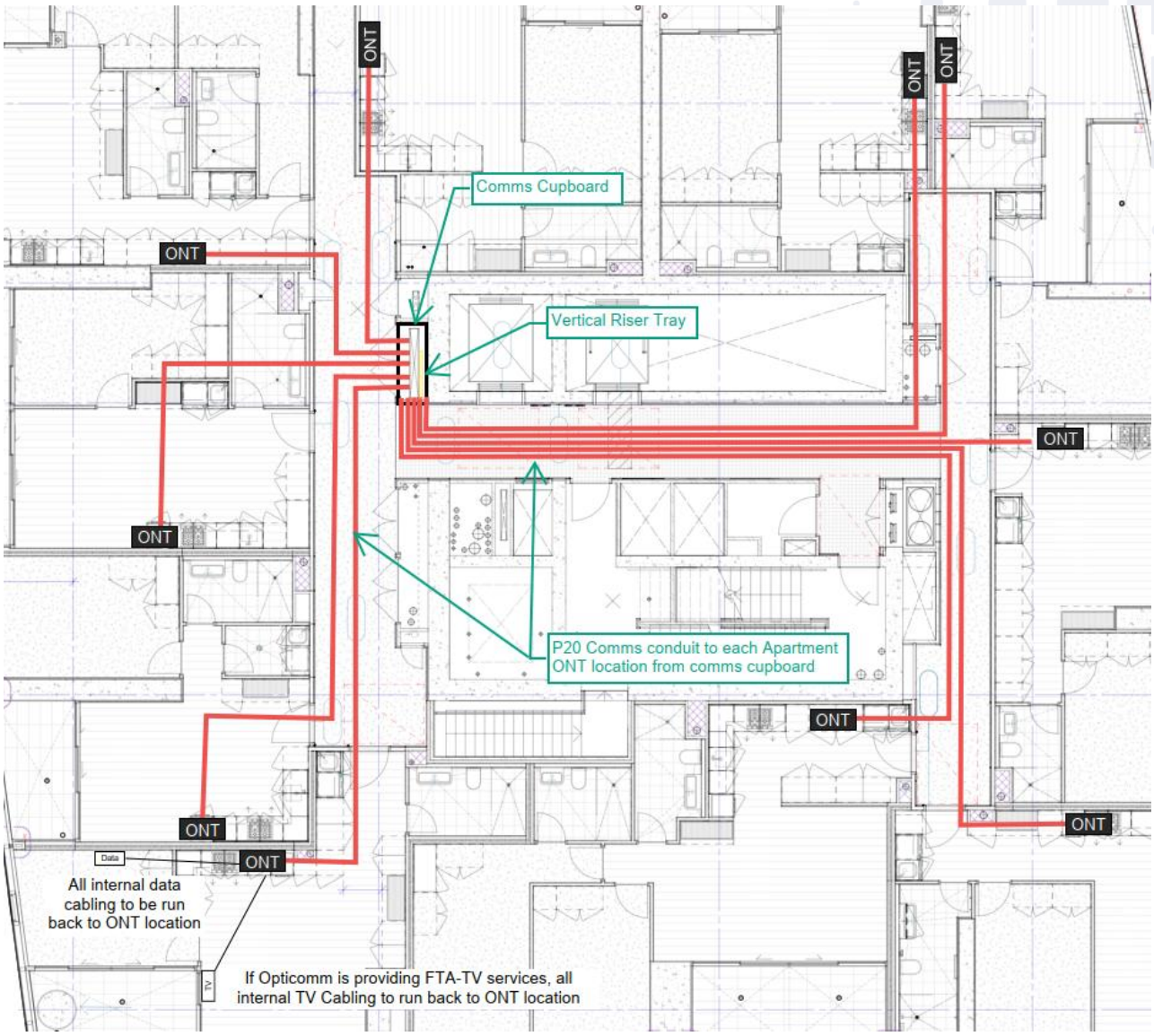


Figure 6: Horizontal cable pathways schematic example(continuous conduit)



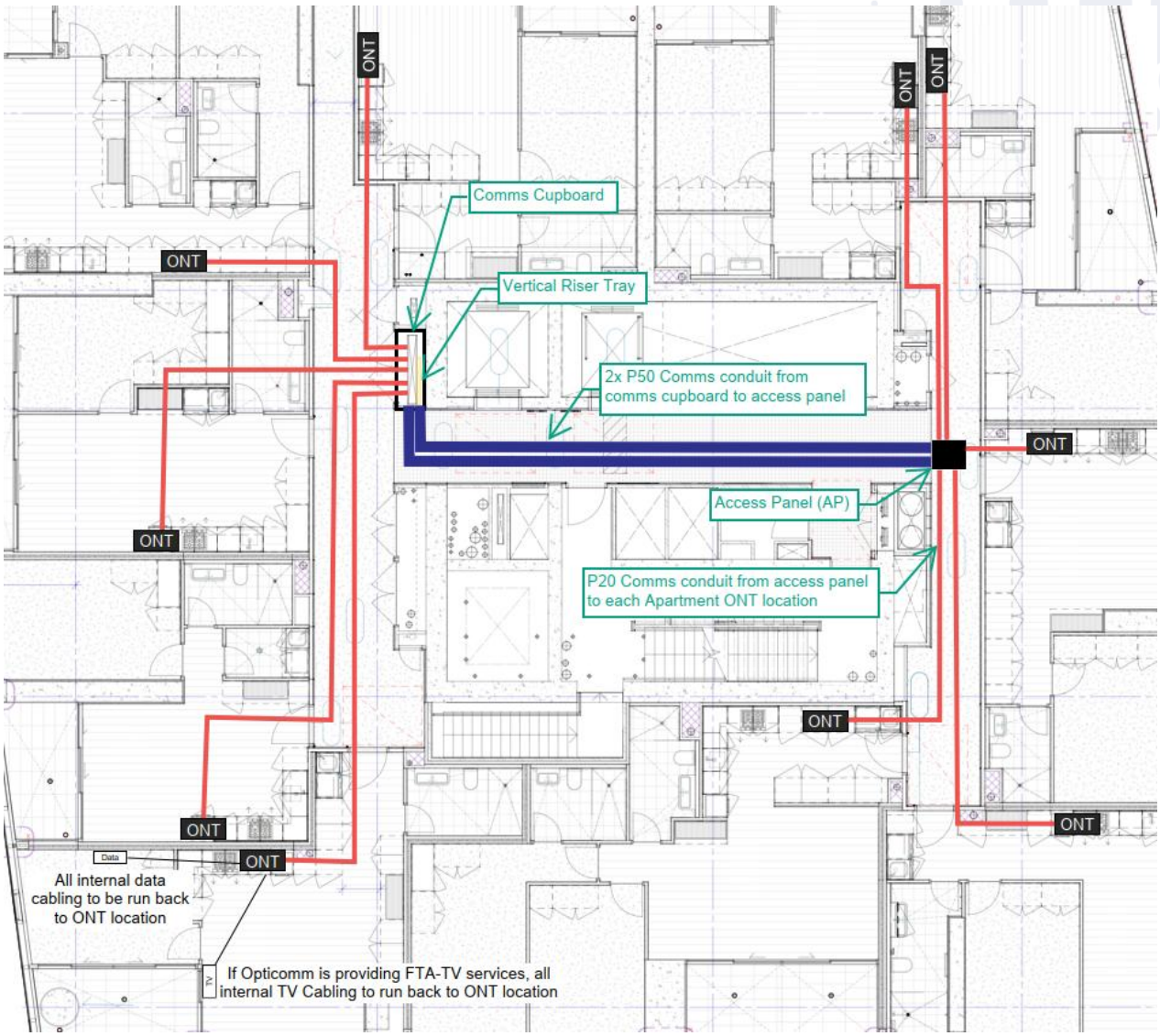
3.4 Option for Shared Horizontal Conduit

Where the continuous horizontal pathway exceeds 50m or 3 bends, a combination of a shared 2x P50 trunk conduit followed by dedicated P20 conduits can be used as long as access panels (APs) are installed at all transition points (refer to Figure 7 below).

Access panels must be:

- A minimum 450mm x 450mm in size
- Within 500mm of any transition and hauling points
- Accessible without an elevated work platform (EWP)

Figure 7: Horizontal cable pathways schematic example (shared conduit)



3.5 Firestopping of Cable Pathways

Firestopping of telecommunications penetrations and pathways is the responsibility of the builder and must comply with the building's fire engineering design and applicable Australian Standards.

Fire sealing must only be completed **after Opticomm fibre installation has been completed**, unless otherwise agreed with the Opticomm Project Manager.

4 Main Comms Room (MCR)

The Main Comms Room (MCR) is located within the base-building and this is where Opticomm houses the main comms racks to support a Telecommunications FTTP Network for the development.

The below outlines the minimum requirements of the Main Comms Room.

4.1 Room Size

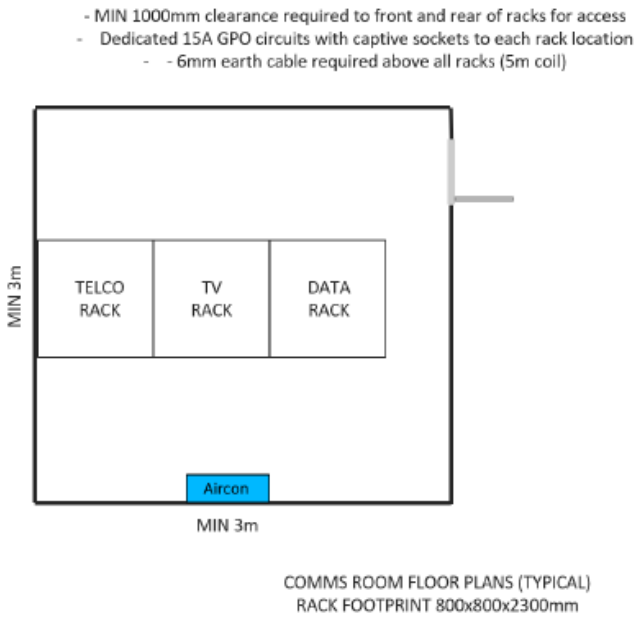
In an MDU development, the Developer must provide Opticomm a secure room with a dedicated floor area of at least 3m x 3m in an appropriate location in the MDU for Opticomm to install its equipment. Opticomm may install up to 3 Comms racks within the Main Comms Room.

Main comms room layout to be coordinated with Opticomm Project Manager upon receipt of electrical drawings (Refer to Figure 8 below).

Table 4: Comms Room typical Rack dimensions

Product Name	Equipment Dimensions (HxWxD)(mm) H(mm)	W(mm)	D(mm)	Comments
Comms Rack	2300	800	800	Comms Room Rack. Space for up to 3 required

Figure 8: Comms room layout example



Where a comms room is not available, an externally-rated cabinet could be an option. This would have been discussed and agreed prior to signing of the agreement (Refer to section 9.2 for more info).

4.2 Finishings

The Developer and Builder must ensure that the Main Comms Room is painted and finished with epoxy flooring. No surface in the room shall be bare concrete or unpainted plasterboard. The room must also be clean, dry, and free from moisture, dust or construction materials prior to Opticomm installation.

4.3 Earthing

A dedicated 6mm earth cable must be provided from the closest MSB/CSB with Main Earthing Terminal (MET) to a position above the comms rack location where a 5m coil is left. Opticomm will then arrange for the earth cable to be connected within the rack. This requirement is fully described in AS/CA S009 and AS/NZS 3000 (See Section 10.3 Appendix C).

4.4 Electrical Requirements

The Developer must provide a Single-phase power connection for Opticomm use (20A min peak capacity) with up to three dedicated 15A GPO circuits on captive sockets provided to the rack location. Refer to section 4.1 for a typical comms room layout.

4.5 Lighting

Adequate lighting is to be provided in the Main Comms Room to meet appropriate Australian Standards and building codes.

4.6 UPS and Fire Protection

Opticomm may install a UPS system in the Main Comms Room. Typical battery capacities and voltages for different sized MDUs are listed below. It is the developer and builder's responsibility to ensure fire protection is suitable to meet all Australian standards and building codes to accommodate this equipment. Wherever possible under the appropriate standards and codes there should not be a water sprinkler installed in the Main Comms Room.

Building size (living units)	Typical UPS Battery capacity (Ah)	Typical UPS Battery Voltage (V)
201 – 1000 units	100	48
> 1000 units	450	48

4.7 Airconditioning Dimensioning

The Developer must supply and install suitable local dedicated air-conditioning equipment to support a maximum 3kW heat load from the Opticomm equipment and maintain a room temperature of no greater than 30 deg C.

4.8 Construction Programme

The Main Comms Room must be available for occupation, including air-conditioning, and permanent power at least 2 months prior to commissioning of the network or any floor within the building.

4.9 Access

The Main Comms Room must be secure and lockable. Opticomm must be granted unhindered access to the room 24/7. Wherever possible Opticomm prefer a room with exclusive access.

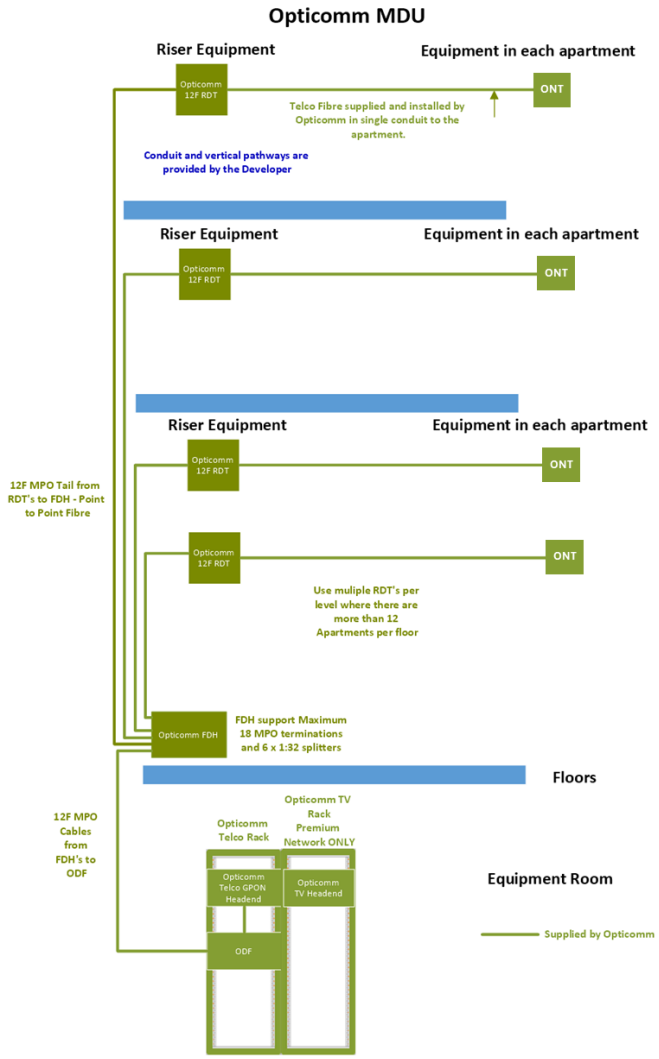
5 Riser Requirements

To support the Telecommunications FTTP network, Opticomm mounts equipment in the riser cupboards to distribute fibre cabling to the apartments in an MDU. The locations of the riser equipment will depend on the building structure and apartment layouts. Typical riser requirements are described in this section.

Note: Where Opticomm cannot mount on the typical riser wall and are advised to mount onto a fire-rated wall or in front of a cable tray, the builder is to supply suitable mounting board/mechanism.

5.1 Typical MDU Topology

Figure 9: Opticomm MDU Topology



5.2 Riser Equipment Dimensions

Figure 10: Typical RDT dimensions (measurements in millimetres)

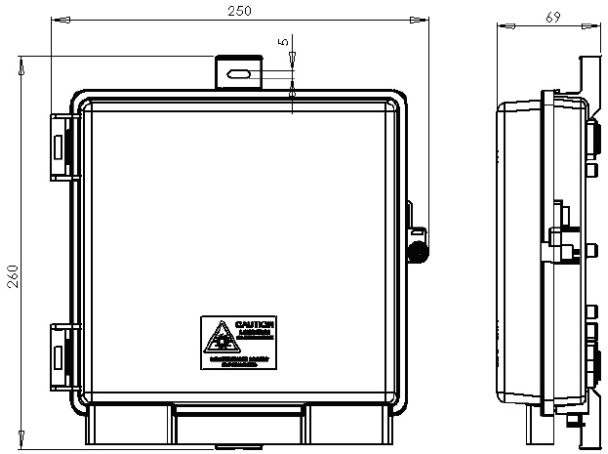
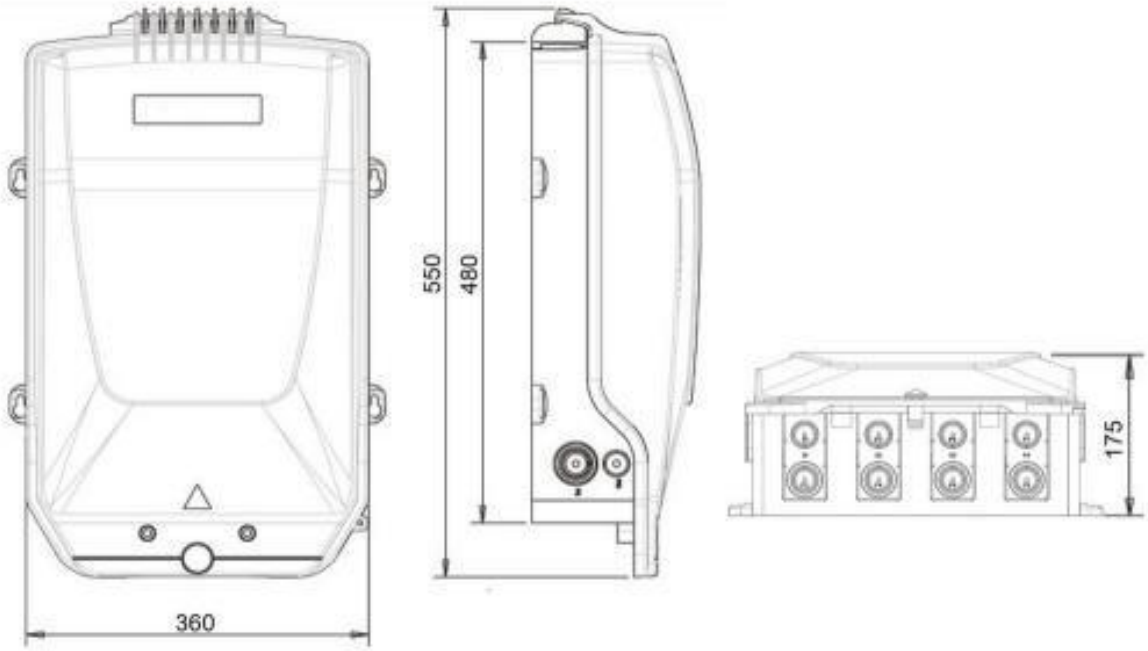


Figure 11: Typical FDH Dimensions (measurements in millimetres)



5.3 Typical Riser Cupboard Layouts (minimum)

Figure 12: Typical Riser Equipment layouts

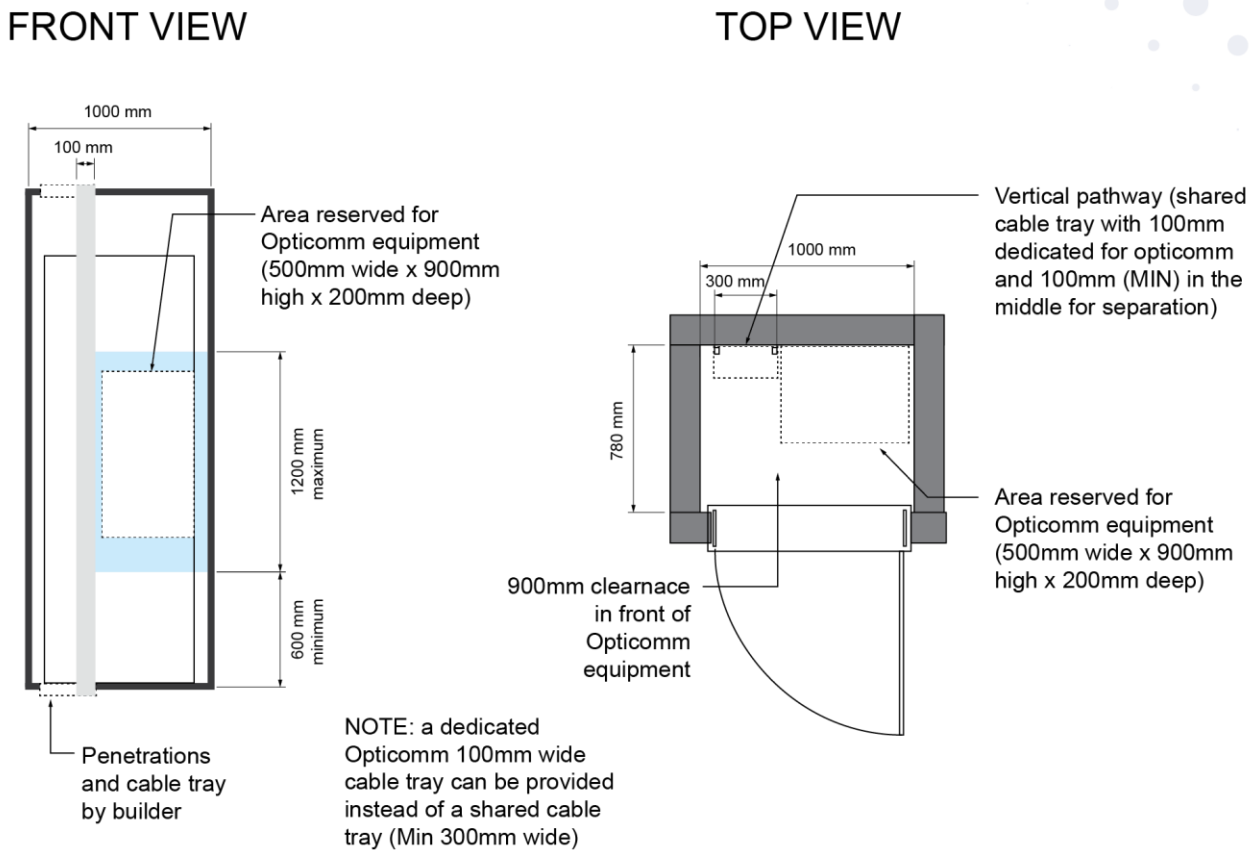


Figure 13: Example of Typical Riser Equipment

6 Roof Equipment

For developments requiring Opticomm's FTA-TV over FTTH network, the Developer must provide Opticomm with exclusive use of a 2m x 2m area on the MDU's roof that meets Opticomm's requirements for the installation, maintenance and operation of telecommunications facilities including TV antennas.

It is the Developer's responsibility to ensure Opticomm has safe access to the MDU roof to install and maintain facilities. The Opticomm Project Manager will work with the developer/builder on defining this suitable location.

There must be a minimum 1 x 32mm ID conduit pathways from this reserved rooftop location to the vertical cable tray in the closest Comms riser.

Depending on the size of the MDU, Opticomm may require a 100mm x 100mm of additional space in the top-most Comms riser to install equipment to boost the FTA-TV signal. If required, Opticomm will need a single phase 10A double GPO and a 6mm earth cable (run from the closest local MSB/CSB with Main Earthing Terminal link) in the Comms riser where equipment is installed.

Note: Opticomm does not perform any waterproof membrane works so it is important the waterproofing schedule is communicated and coordinated with the Opticomm Project Manager prior.

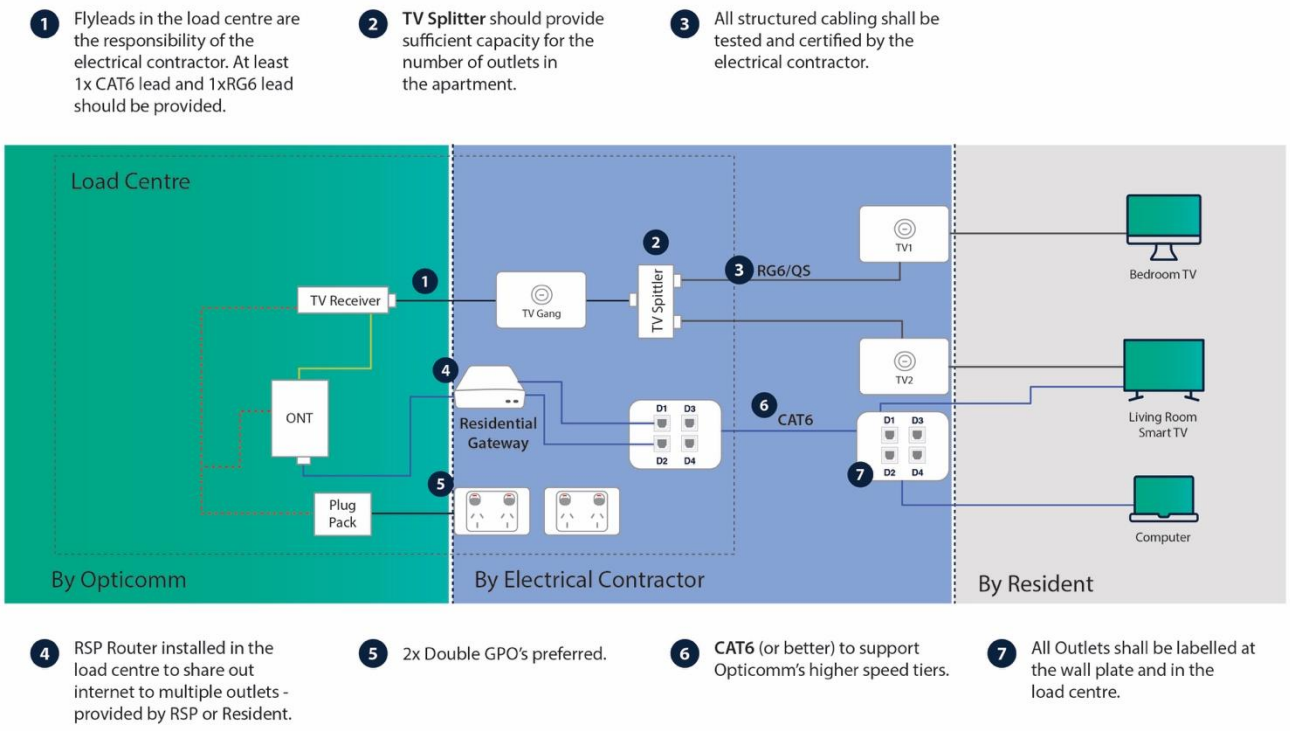
7 Apartment Equipment

The ONT is part of Opticomm's apartment equipment that is installed by Opticomm. To ensure the ONT can be adequately installed, accessed and maintained the following conditions must be met:

- ONT to be installed between 350mm and 1800mm above Finished Floor Level (FFL). Up to 2400mm is allowed if installed above fridge joinery.
- Depth of joinery to be between 100mm and 150mm.
- Minimum clearance of 900mm must be provided in front of ONT to allow safe access for residents and technicians
- Installations outside of these heights and clearances will be subject to Opticomm review and approval.

The following figures describe how the equipment should be wired in the apartments and the typical layouts as well as **minimum** clearances.

Figure 14: Apartment wiring diagram and demarcation



Note: Above wiring diagram is drawn with FTA-TV functionality on Opticomm's network. For networks without this functionality, TV wiring in unit is to be cabled directly to the comms riser.

Figure 15: Typical apartment layout with minimum clearances (horizontal arrangement)

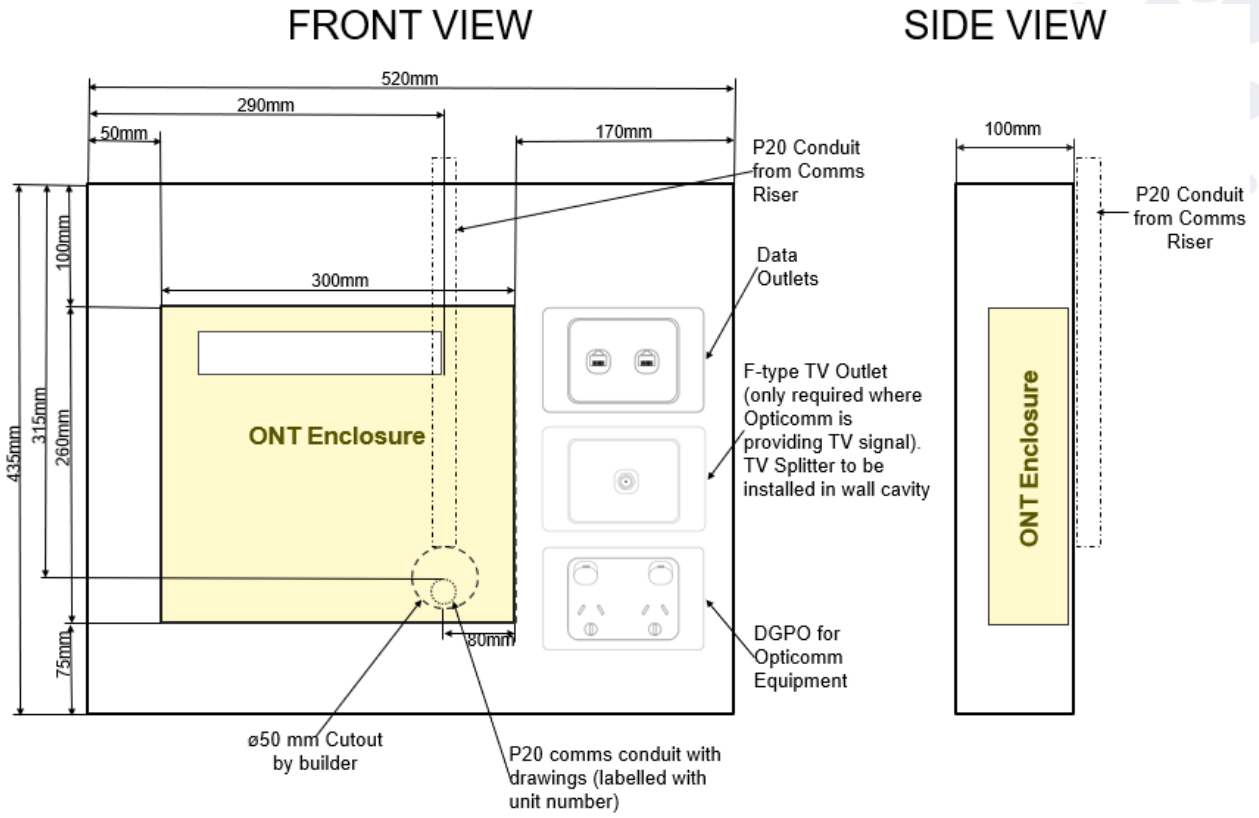
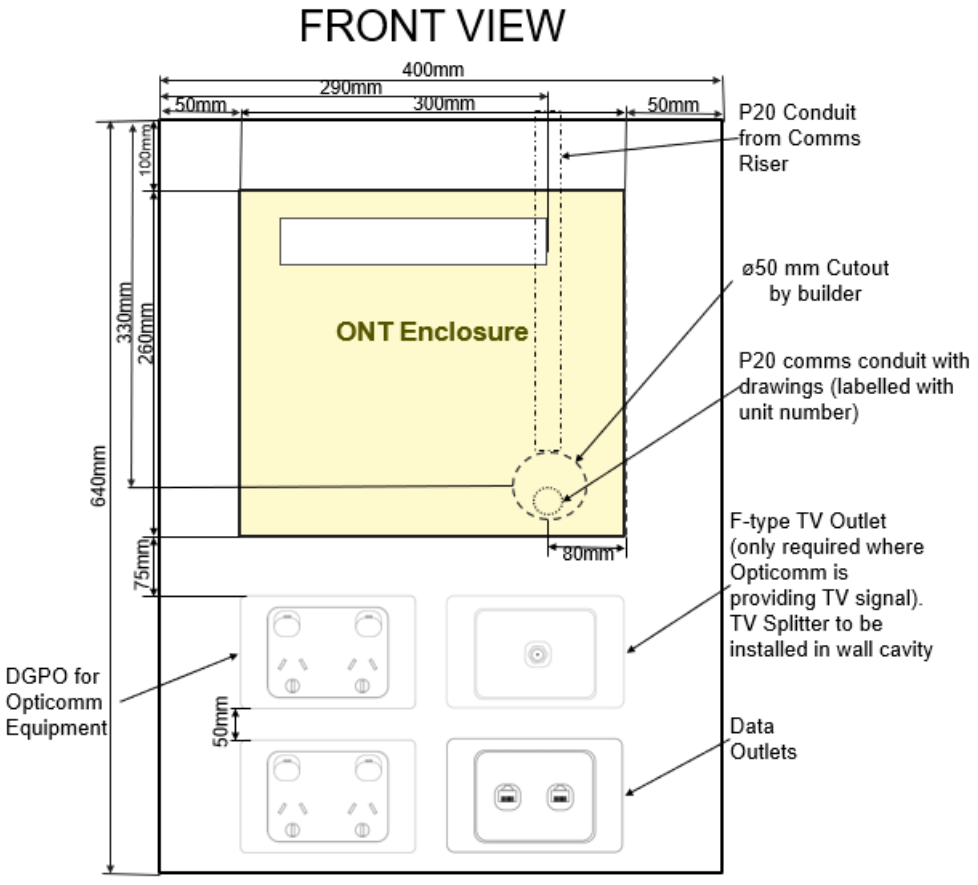


Figure 16: Typical apartment layout with minimum clearances (vertical arrangement)



8 Documentation to be Provided by Developer

Prior to the commencement of works the developer and/or builder will issue to Opticomm copies of the following documents:

- Address list (Opticomm document supplied to Developer to be completed and returned)
- Electrical/cable tray reticulation design of every floor
- Riser layout design and dimensions
- Apartment end point location and dimensions
- Main Comms Room design and dimensions
- Plan of Subdivision/Community Title Scheme if/when available

9 Optional Add-on Services

Opticomm may offer the developer optional add-on services to support their development requirements. These optional add-ons are agreed at time of signing of the Telecommunications Agreement. Please consult with the Opticomm Project Manager to confirm if this is an agreed add-on prior to undertaking any works in relation to these services.

9.1 Smart Trunk Option

The purpose of Smart Trunks as an add-on service is to create a parallel network which allows transport of building services data via Opticomm's cabling infrastructure. This can be provided as the following two solutions:

Solution 1 - Smart Trunk (Fibre Only Option)

This Smart Trunk option transports building services via Opticomm dark fibre. Dark fibre is handed off as a pair of SC/APC fibres (Single Mode OS2) in the nominated comms riser and Main Comms Room. It is the Building Automation Services (BAS) or Integrated Communication System (ICN) contractor's responsibility to procure the necessary/appropriate equipment to support the Smart Trunk solution.

Solution 2 - Smart Trunk (Fibre and Cat6 cable Option)

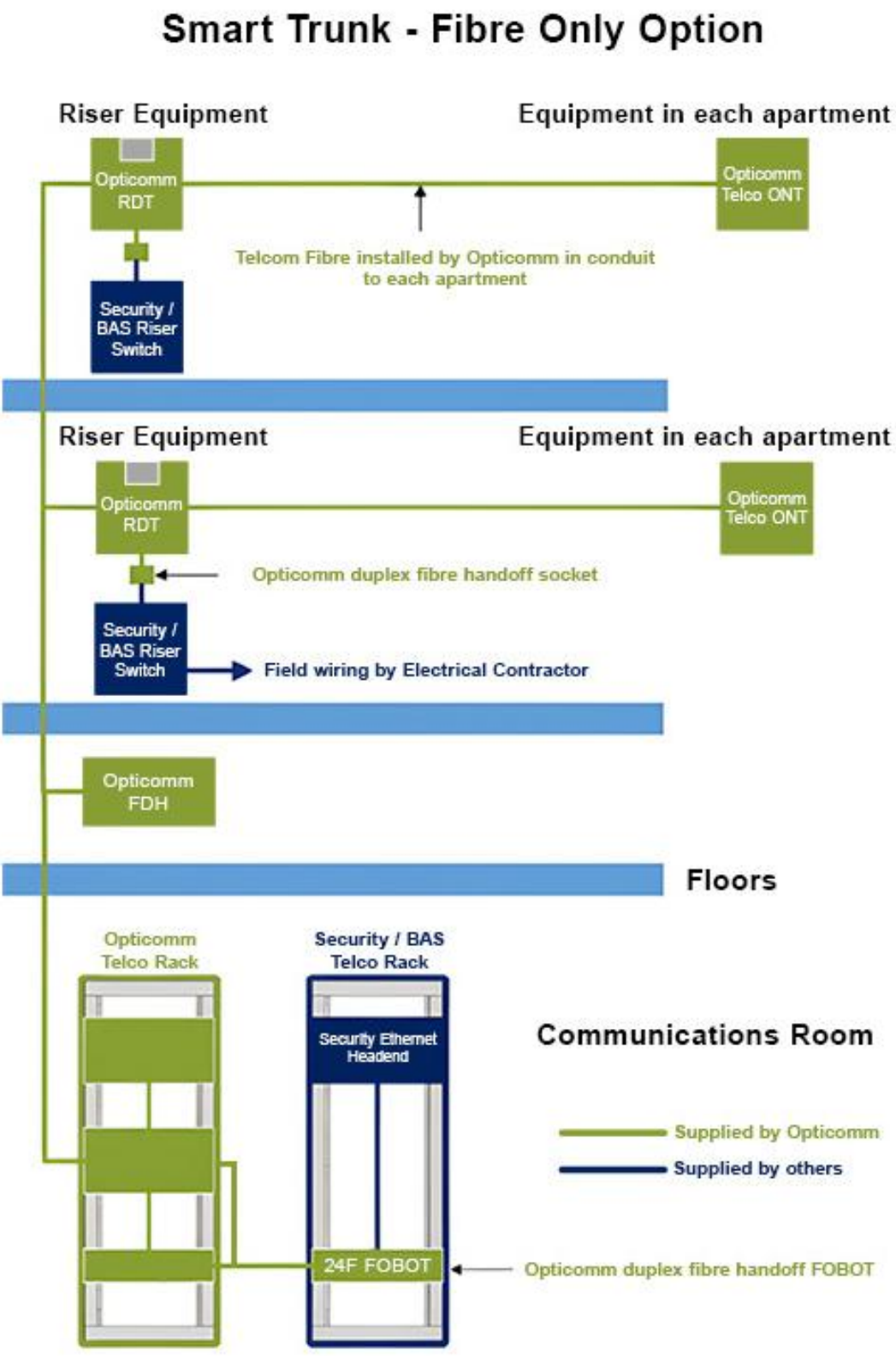
This option includes the above (Fibre Only Option) however has an additional unterminated Cat6 cable between the comms riser and the apartment ONT location for use by the BAS/ICN Contractor.

The additional unterminated Cat6 cable is to support in-room services such as security and intercom. The BAS/ICN Contractor is responsible for all data cable terminations.

Note: The Smart Trunk infrastructure must only be used to support building services and are not for use by another Telecommunications Carrier. Opticomm also retains ownership of all Smart Trunk infrastructure.

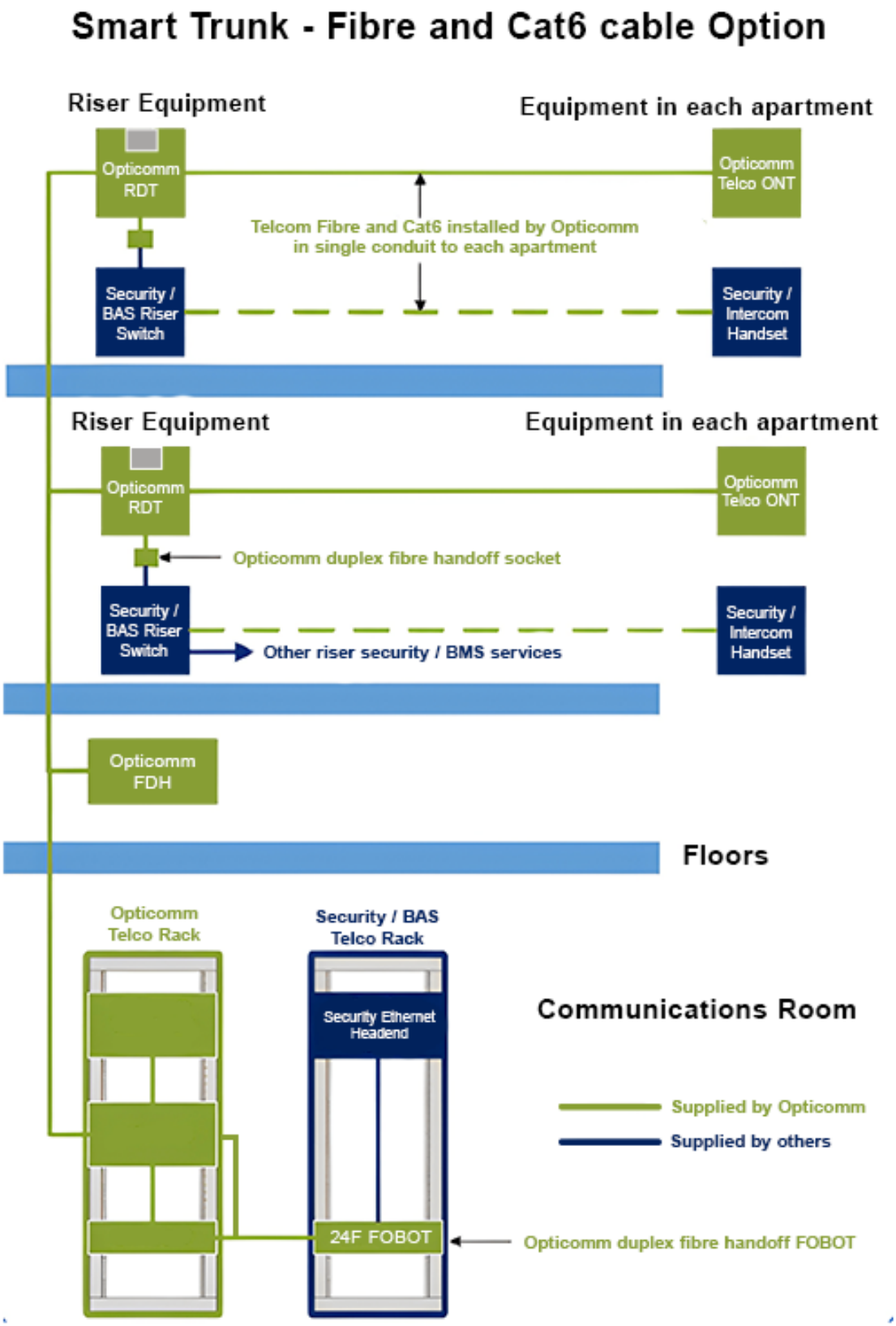
The following figures show a typical high-level topology of the two Smart Trunk options:

Figure 17: Smart Trunk - Fibre Only Option



Note: All Opticomm fibre handoffs are SC/APC Single Mode Optical Fibre OS2

Figure 18: Smart Trunk - Fibre and Cat6 cable Option



Note: All Opticomm fibre handoffs are SC/APC Single Mode Optical Fibre OS2. All Opticomm CAT6 handoffs are unterminated

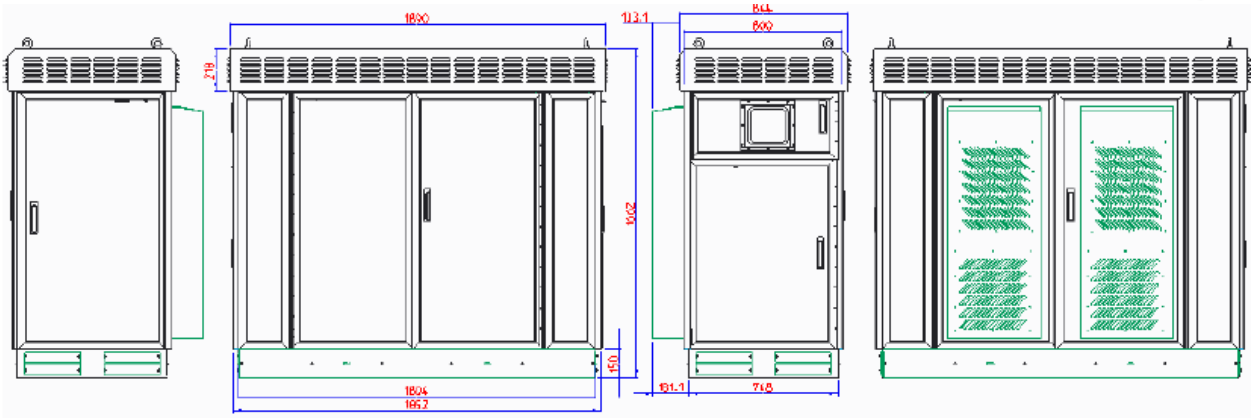
Table 5: Smart Trunk Roles and Responsibilities Matrix

Line Item	Smart Trunk Component	Specify	Supply	Install	Commission & Test	Sign Off
1	Supply and Install riser switch and rack (incl. SFPs and patchleads)	Developer/BAS Contractor	Developer/BAS Contractor	Developer/BAS Contractor	Developer/BAS Contractor	Developer/BAS Contractor
2	Integrate to building automation system (BAS or ICN)	Developer/BAS Contractor	Developer/BAS Contractor	Developer/BAS Contractor	Developer/BAS Contractor	Developer/BAS Contractor
3	Supply and install a duplex Single-mode OS2 Fibre cable with a SC/APC connector from each nominated floor riser to basement comms room **(Smart Trunk - Fibre Only Option)**	OptiComm	OptiComm	OptiComm	OptiComm	OptiComm
4	Supply and install an unterminated Cat6 cable from the floor riser to apartment ONT location **(Smart Trunk - Fibre and Cat6 cable Option)**	OptiComm	OptiComm	OptiComm	Developer/Electrical Contractor	Developer/Electrical Contractor
5	Extend and terminate Opticomm supplied Cat6 cable to end devices	Developer/Electrical Contractor	Developer/Electrical Contractor	Developer/Electrical Contractor	Developer/Electrical Contractor	Developer/Electrical Contractor

9.2 External Cabinet Option

Where previously agreed and a comms room is not available, an external roadside cabinet may be deployed. The cabinet may be mounted external to the building or in a carpark. This option incurs extra expenses and must be agreed prior to signing of the Telecommunications Agreement.

Figure 19: External Cabinet Option



10 Appendices

10.1 Appendix A - Minimum Separation Requirements

The below diagrams and tables are extracted from AS/CA S009:2020 Installation requirements for customer cabling (Wiring Rules)

Customer Cabling situation		Electricity								Oxygen or flammable gas				Water or waste [9]				Heating oil, steam or compressed air		
		ELV		LV		HV														
		Cable	Connection	Cable	Connection	Cable		Connection[4]		Pipe	Connection	Meter	Cylinder	Pipe	Connection	Meter	Pump/ Cistern	Pipe	Connection	Pump/ Tank
						MC [5]	SC [5]	MC [5]	SC [5]											
Metallic Cable	Unenclosed	0		50 [2]	150 [3]	300 [6]	450			150 [7]	150			50		150		150 [7]	150	
	In Conduit	0		0	150 [3]	150	450			150 [7]	150			0		150		150 [7]	150	
	Connection, TO or joint	0	150 [3]	50 [2]	150 [3]	450				150	Outside hazardous area [8]			150				150		
Optical fibre Cable [1]	Unenclosed	0		0	150 [3]	0	450			150 [7]	150			50		150		150 [7]	150	
	In Conduit	0		0	150 [3]	0	450			150 [7]	150			0		150		150 [7]	150	
	Connection or splice	0	150 [3]	0	150 [3]	0	450			150	Outside hazardous area [8]			150				150		

Note 1: If the optical fibre Cable contains any Electrically Conductive Elements (e.g. a metallic strength member, armouring or tracer), it is to be treated as a metallic Cable).

Note 2: If the Cables are separated by a barrier of durable insulating material or metal or within a Conduit, no further separation is required unless the Cables are within 50 mm of any securing face of Building structure that may be screwed or nailed.

Note 3: Cabling Providers working on Customer Cabling are to be protected against accidental contact with ELV or LV electrical connections by effective means (for example, an insulated barrier, a shield, shroud or suitable distance). The Customer Cabling connections are to be separated from ELV/LV electrical connections by at least 150 mm by a permanent, rigidly fixed barrier of durable insulating material or earthed metal. In the case where such a fixed barrier is applied, no further separation is required.

Note 4: The installation of Customer Cabling conductors or terminations in the same Enclosure as any HV conductor or terminations is not permitted.

Note 5: MC = Multi-Core SC = Single Core

Note 6: This may be reduced to a minimum of 150 mm if the Cables are separated by a permanent, rigidly fixed barrier of durable insulating material or earthed metal provided that a minimum clearance between the Cables through air anywhere around or over or under the barrier is at least 175 mm.

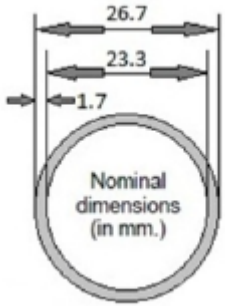
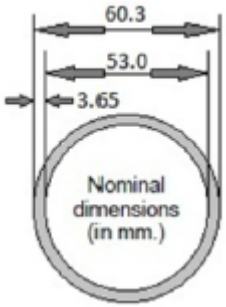
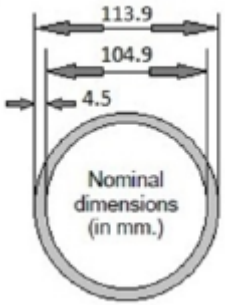
Note 7: Separation by a suitable barrier or heat insulation, as appropriate, is acceptable at crossings, within wall cavities or within shared Trunking

Note 8: Connection devices, Telecommunications Outlets, joints or splices are not to be installed within a Hazardous Area unless they are selected and installed in accordance with Clause 7.1.3.7.

Note 9: These are the recommended minimum separation distances to ensure compliance with Clause 9.2.1 and to provide adequate clearance to install or access the telecommunications Cabling.

Note 10: All dimensions given are in millimetres (mm).

10.2 Appendix B – Conduit sizes

Conduit Dimensions White Telecommunications	Nominal Size (Inside Diameter)	Conduit Dimensions White Telecommunications	Nominal Size (Inside Diameter)	Conduit Dimensions White Telecommunications	Nominal Size (Inside Diameter)
	20 mm PN 12 AS/NZS 1477:2006 table 4.2(A)		50 mm PN 12 AS/NZS 1477:2006 table 4.2(A)		100 mm PN 9 AS/NZS 1477:2006 table 4.2(A)
Typical Apartment fibre pathway		**Typical Riser Interconnections (core hole requirement 76mm)**		**Typical Building Lead-in Conduits (core hole requirement 122mm)**	

10.3 Appendix C - Reference Documents

Standard No	Document Title
AS/NZS 3000:2018	Electrical Installation and wiring rules
AS/NZS 3080:2013	Generic cabling for customer premises
AS/NZS 3084:2017	Telecommunications pathways and spaces for Commercial Buildings
AS/CA S009:2020	Installation requirements for customer cabling (Wiring Rules)
AS/CA S008:2020	Requirements for Customer Cabling products
AS/NZS IEC61935.1	Testing of balanced communication cabling in accordance with ISO/IEC 11801 Installed cabling
NCC 2022	Building Code of Australia Volume 1
ANSI/TIA-568.0-D	Generic Telecommunications cabling for customer premises
ANSI/TIA-568-2.D	Balance Twisted-Pair Telecommunications cabling and Components
ANSI/TIA-568.4-D	Broadband Coaxial Cabling and components
G645:2017	Fibre Ready Pit and Pipe Specification for Real Estate Development Projects